REMARKS

Claims 26-28 have been added, and claims 7, 10, 11, 14, 15, and 22 have been amended. Claims 23-25 were previously canceled. Therefore, claims 1-22 and 26-28 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

Section 101 Rejection:

The Office Action rejected claims 1-22 under 35 U.S.C. § 101 on the grounds that the claimed invention is directed to non-statutory subject matter. Specifically, the Examiner asserts that the claims are directed to an apparatus and method "for merely performing manipulations and calculations of data values." Office Action at 2. The Examiner further asserts that "the claimed invention must recite a practical application," and cites *State Street* for the proposition that such a practical application must include transforming a physical object to a different state or thing, or producing a useful, concrete, and tangible result. *Id.* The Examiner asserts that numerical values produced by the subject matter of the recited claims fail to constitute a useful, concrete, and tangible result, and further asserts that the claims are directed to a preemption of a method of manipulating data. *Id.* Applicant traverses the Examiner's remarks and submits that the pending claims recite statutory subject matter for at least the reasons that follow.

First, Applicant notes that a circuit, as an apparatus, is in fact statutory subject matter, as is a system including such a circuit and a method of operation of the circuit. Referring to the inquiry set forth in MPEP 2106.IV.C, it must then be determined whether the claim at issue recites a "judicial exception" – a law of nature, a natural phenomenon, or an abstract idea – or whether the claim recites a "practical application" of a judicial exception producing a "useful, concrete, and tangible result." Applicant notes that the claims recite specific physical constructs such as partial product generation logic, carry save adders, carry propagate adders, and other types of circuitry configured in

specifically recited ways, and therefore submit that the "judicial exceptions" simply do not apply. Since the claims recite statutory physical circuit structures and their methods of operation, Applicant submits that the inquiry into whether the claims produce a "useful, concrete, and tangible result" is irrelevant, since this inquiry only applies when a "judicial exception" is in issue. MPEP 2106.IV.C.1.

However, Applicant notes that the fact that the claims produce a useful, concrete, and tangible result is in fact evident from the Examiner's remarks. That is, the Examiner observes that the claims recite features configured to perform "calculations of data values." Applicant submits that performing multiplication is itself an example of providing a useful, concrete, and tangible result. More specifically, Applicant notes that claim 1 recites, *inter alia*:

> "partial product generation logic configured to generate a plurality of partial products"
>
> "a plurality of carry save adders . . . configured to accumulate said plurality of partial products generated during said first partial product execution phase into a redundant product"
>
> "a first carry propagate adder . . . configured to reduce a first portion of said redundant product to a multiplicative product."

Applicant submits that one of ordinary skill in the art would readily recognize that the physical features of adders and other logic recited in claim 1 are arranged in specific ways so as to produce a number of concrete and tangible results having to do with the production of a multiplicative product. Moreover, these results are specifically recited within the claim: partial products, a redundant product, and a multiplicative product. Applicant further submits that the usefulness of processing such data is abundantly evident from the many examples of real-world circuits that implement computer arithmetic.

Applicant further submits that the Examiner's comments regarding preemption are inapposite. Preemption applies where a claim comprises every substantial practical application of an abstract idea. MPEP 2106.IV.C.3. This section provides, as an example of preemption, "a computer that solely calculates a mathematical formula." *Id.* Applicant notes that the claims do not recite a mathematical formula in the abstract. Instead, as noted above, the claims recite specific structure configured to perform specific operations in the service of implementing multiplier functionality. Applicant notes that one of ordinary skill in the art would recognize a number of ways of performing the abstract function of multiplication that do not fall within the scope of the pending claims. For example, a circuit could iteratively add a multiplicand value to itself the number of times specified by the multiplier value to produce the multiplicative product. Since this embodiment of multiplication falls outside the scope of the claims, the claims cannot be said to preempt the abstract function of multiplication.

For at least the foregoing reasons, Applicant submits that the pending claims recite statutory subject matter, and respectfully request that the 35 U.S.C. § 101 rejection be withdrawn.

Section 103(a) Rejections:

The Office Action rejected claims 1-22 under 35 U.S.C. § 103(a) as being unpatentable over Song et al. (U.S. Patent 6,144,979) (hereinafter Song) or, alternatively, as being unpatentable over Anderson et al. (U.S. Patent No. 5,220,525) (hereinafter Anderson). Applicant traverses this rejection and submits that the rejections of the pending claims are not supported by either Song or Anderson for at least the following reasons.

Regarding claim 1, both Song and Anderson fail to teach or suggest a floating point multiplier circuit configured for performing extended-precision multiplication of an N-bit multiplicand value by an M-bit multiplier value, wherein N and M are positive

integers, said floating point multiplier circuit comprising: partial product generation logic configured to generate a plurality of partial products from said multiplicand value and said multiplier value, wherein said plurality of partial products corresponds to a first portion of said multiplier value during a first partial product execution phase, and wherein said plurality of partial products further corresponds to a second portion of said multiplier value during a second partial product execution phase; a plurality of carry save adders coupled to said partial product generation logic and configured to accumulate said plurality of partial products generated during said first partial product execution phase into a redundant product during a first carry save adder execution phase, and further configured to accumulate said plurality of partial products generated during said second partial product execution phase into said redundant sum during a second carry save adder execution phase; and a first carry propagate adder coupled to said plurality of carry save adders and configured to reduce a first portion of said redundant product to a multiplicative product during a first carry propagate adder phase, and further configured to reduce a second portion of said redundant product to said multiplicative product during a second carry propagate adder phase; wherein said first carry propagate adder phase begins after said second carry save adder execution phase completes.

In rejecting claim 1, the Examiner acknowledges that neither Song nor Anderson disclose the recited claim feature in which the first carry propagate adder phase begins after the second carry save adder execution phase completes, but asserts that it would have been obvious to modify either Song or Anderson in this fashion, because "the modification is well within the level of ordinary skill in the art and does not result in any unexpected result." Office Action at 4.

Applicant traverses the Examiner's assertion. The Examiner's conclusion regarding the feature of claim 1 acknowledged to be absent from both Song and Anderson is merely speculative and is unsupported by any evidence of record. There is simply no suggestion in either reference as to delaying carry propagate adder (CPA) operation until after carry save adder (CSA) execution completes, as required by claim 1. Moreover, Applicant notes that as illustrated in Figure 3, beginning CPA operation after

CSA operation completes results in the CPA not being active at the same time as the CSA for a given multiplication operation. *See, e.g.,* Figure 3, cycles 3–4. This may result in lower total power consumption or lower dynamic (e.g., cycle-to-cycle) fluctuation in power consumption relative to embodiments in which CPA operation overlaps CSA operation for a given multiplication operation. As a result, the embodiment recited in claim 1 behaves differently from the embodiments of Song and Anderson.

Similar arguments apply to independent claims 10 and 16, which recite features similar to those of claim 1. Therefore, Applicant submits that the rejections of the independent claims are unsupported.

Applicant notes that the rejections of numerous ones of the dependent claims are further unsupported by the cited references. For example, neither Song nor Anderson discuss any aspect of the rounding features recited in various ones of the dependent claims. Moreover, **Applicant notes that the Examiner has not even attempted to state a prima facie case with respect to any of the dependent claims.** However, as the rejections of the independent claims have been shown above to be unsupported, further discussion of the dependent claims is unnecessary at this time.

Applicant further submits that rejection of added claims 26-28 would likewise be unsupported by the cited references. In particular, Applicant notes that neither Song nor Anderson makes any mention of a multiplier having different modes of operation in which different precisions of multiplication are performed, as recited in claim 26. Moreover, neither reference discloses any aspect of the recited throughput of the different modes of operation.

CONCLUSION

Applicant submits the application is in condition for allowance, and notice to that effect is requested.

If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5500-97400/AMP.

Respectfully submitted,

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